

REMARKS

Amendments

Prior to entry of the amendment set forth above, Claims 1-46 were pending, including thirteen independent Claims 1, 6-8, 20, 24, 26 and 41-46. The amendment set forth above cancels nine dependent Claims 2-3, 9-11, 16-17, 19 and 23, as well as independent claim 46, without prejudice. It also adds eleven new dependent Claims 47-57, such that after entry of the amendment forty-seven Claims 1, 4-8, 12-15, 18, 20-22, 24-45 and 47-57 are pending, including twelve independent Claims 1, 6-8, 20, 24, 26 and 41-45.

No new matter is added by the amendment. Claims 1, 5, 12-13, 15, 18, 24, 26-27, 34 and 41-45 are amended, and new Claims 47-57 are added. Support for these amendments is set forth below.

The amendments to Claims 1, 5, 12-13, and most of the amendments to Claims 41-45 are supported in many places in the specification, for example, by the parameter A_k of the equations of Claims 6, 7 and 8 as originally filed, and as described in the application subsection entitled "*Utilization of Adjustment Parameter A_k - QOS and Power Control.*" [p.39 l.12 – p.40 l.13].

The amendments to Claim 15 are supported by previous Claim 16, which is now canceled. Similarly, the amendments to Claim 18 are supported by previous Claim 19, which is now canceled. The amendments to Claims 26 and 27 merely correct typographical errors; in Claim 27, only a dangling semicolon is removed.

Amendments to Claim 24 include rephrasing such that all of the steps can be performed by a single entity (transmitter). In element (d), the nature of the feedback is clarified, in part by use of a negative limitation. The limitation, "rather than directly indicating channel estimation information," is highly useful for distinguishing the defined invention. The negative limitation is supported, for example, at [in the last paragraph of p.32], which recites in part (underlining added for emphasis):

The present inventive method can determine the weight vector as an iterative update of the weights that are specific to a receiver without direct measurement and state reporting of the channel from each individual antenna to the receiver.

The amendment to Claim 34 clarifies the term "feedback bit," as supported for example by FIGURE 12, especially items 316 and 318, together with the accompanying text and the claim as originally filed. This reduces a possible ambiguity: because virtually all feedback in digital communication systems includes at least one bit, the clarification avoid a possibility that "bit" could be construed as redundant or meaningless.

In addition to the amendments supported as indicated above, an amendment to Claim 42 corrects an error: the weight vector was indicated as associated with the transmitter. Instead, each weight vector in preferred embodiments throughout the specification corresponds to a particular receiver [*e.g., id.*, "updates that are specific to a receiver"]. Also in Claim 42, "even" and "odd" probing signals are somewhat generalized to "a plurality" of probing signals, consistent with terminology used elsewhere, and a misplaced word "means" is deleted. An amendment to Claim 43 corrects an obvious mistake, omitting a term including "means" that lacks antecedent basis. In Claims 44 and 45, a vague phrase "responsive to the initialization means," which did not usefully limit the claim, has been omitted.

New claims 47-57 are added to replace claims canceled hereby. The elements of these claims are drawn from other pending or previous claims, which therefore provide support. These claims combine elements of both the reduction of interference to proximate receivers (an aspect to which Claim 1, for example, is primarily directed), and stochastic gradient feedback (an aspect to which Claim 24, for example, is primarily directed). Support for the combination of these elements is provided throughout the specification; the stochastic gradient method of feedback is described as an exemplary method for updating the weight vector [*e.g.,* last paragraph of p.32, as cited above].

Rejections

First, it is respectfully suggested that, in the response dated January 26, 2007, the Examiner may have overlooked the amendment of Claims 20 and 26 into proper independent form. The Examiner previously objected to these claims as allowable but dependent on a rejected base claim, yet that objection is repeated in the current Office Action. These claims are believed to conform to the Examiner's requirements.

Claim 46 is canceled to obviate the Examiner's rejection in section 7 of the current Office Action; cancellation should not be construed as prejudicing the Applicant's right to later reinstate the essence of the claim in this or a subsequent application.

In section 8 of the current Office Action, the Examiner rejects Claims 1-5, 9-13, 19, 24-25 and 41-45 as anticipated by Raleigh. Raleigh, however, does not disclose reducing interference to proximate receivers in a manner that enables individual weighting for particular non-target receivers. This point is not belabored, because the Examiner's allowance of all claims including the parameter A_k , which can perform this feature, suggests that the Examiner is aware of this fact. The amendments set forth above for Claims 1, 5, 12-13, and 41-45 require such feature. Consequently, it is respectfully submitted that each of Claims 1 and 41-45, as

currently amended, is clearly distinguished over Raleigh by virtue of requiring a form of individually weightable interference reduction. Claims depending from Claim 1 have also been amended to be consistent with such limitation, such that they properly depend from Claim 1 and are therefore also well distinguished over Raleigh.

Claim 24, and the claims depending therefrom, is a somewhat different case. Claim 24, as currently amended, requires in part: "obtaining, from each receiver, feedback that indicates which of the plurality of corresponding transmit probing signals generated in act (c) for each receiver was received better, rather than directly indicating channel estimate information." Thus, Claim 24, as currently amended, requires special feedback, examples of which are sometimes generically called "binary gradient feedback" or "stochastic gradient method." In one of its simplest forms, stochastic gradient feedback requires only a single bit of feedback information to be periodically provided to the transmitter from the target receiver. This contrasts spectacularly with the much larger quantity of information necessary to report channel estimate or state information from the receiver to the transmitter, as is conventionally found necessary. The negative limitation is particularly useful because it not only clarifies the nature of the feedback, but underscores the potential benefit of reducing feedback data rates. Codes may be used to reduce the quantity of feedback data transmitted, but at a cost in resolution and accuracy. The method of feedback required by Claim 24, as presently amended, is respectfully submitted to be very well distinguished over Raleigh, because Raleigh does not suggest anything other than conventional feedback of channel state information.

The following remarks briefly explain simple embodiments of the stochastic gradient feedback method, not to limit scope, but to aid in understanding the requirements of Claim 24, as currently amended. Exemplary systems employing this feedback technique frequently test the weighting vector employed for a given receiver, typically by perturbing the weighting vector one way during even time periods, and the opposite way during odd time periods. The receiver need only determine whether the received power (or other measure of quality) is better during the even periods, or during the odd periods, and can convey this conclusion back to the transmitter by means of a single bit of feedback. Of course, there are many varieties of binary gradient feedback: more bits could be used, and indeed may be necessary if multiple different probing signals are being compared, as in some embodiments. However, all of these feedback techniques have in common that the transmitter sends probing test signals, and the receiver need only feed back an indication of which of the probe signals gives a better result, rather than needing to report channel estimate information.

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As presently amended, therefore, it is respectfully submitted that Claim 24 is well distinguished over Raleigh. The remaining claims either have previously been found allowable, and amended as proper independent claims; or they depend from such allowable claim; or they properly depend from Claim 1, or from Claim 24. As such, all of the claims pending in the application are believed properly allowable over the cited prior art, and such allowance is respectfully requested.

Conclusion

It is respectfully submitted that the amendment and remarks set forth above overcome each ground of rejection set forth by the Examiner. As such, the Examiner is respectfully requested to reconsider the application, to withdraw all previous rejections, and, barring the discovery of new grounds for rejection, to promptly issue a Notice of Allowance of all pending claims.

The Commissioner is authorized to construe this paper as including a petition to extend the period for response by the number of months necessary to make this paper timely filed. Fees or deficiencies required to cause the response to be complete and timely filed may be charged, and any overpayments should be credited, to our Deposit Account No. 50-0490.

Respectfully submitted,

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